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Atty. Docket No.  
00-713-i17

Serial No.  
09/976.968

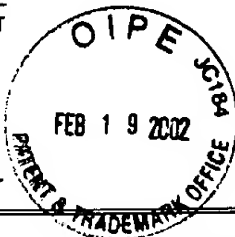
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## U.S. PATENT DOCUMENTS

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## FOREIGN PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS							
		Document Number	Date	Country	Class	Subclass	Translation Yes No
<i>M</i>	1.	WO 92/04469	19 March 1992	PCT	<del>                    </del>		X
<i>M</i>	2.	WO 90/02205	8 March 1990	PCT	<del>                    </del>		X

**OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.**

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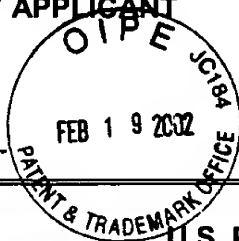
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u	1.	4,193,983	3/18/80	Ullman et al.			
	2.	4,256,834	3/17/81	Zuk et al.			
	3.	4,261,968	4/14/81	Ullman et al.			
	4.	4,313,734	2/2/82	Leuving			
	5.	4,318,707	3/9/82	Litman et al.			
	6.	4,650,770	3/17/87	Liu et al.			
	7.	4,713,348	12/15/87	Ullman			
	8.	4,853,335	8/1/89	Olsen et al.			
	9.	4,868,104	9/19/89	Kura et al.			
	10.	5,225,064	7/6/93	Henkens et al.			
	11.	5,294,369	3/15/94	Shigekawa et al.			
u	12.	5,384,073	1/24/95	Shigekawa et al.			
	13.	<del>5,384,265</del>	<del>1/24/95</del>	<del>Kidwell et al.</del> Dup.			
u	14.	5,460,831	10/24/95	Kossovsky et al.			
	15.	<del>5,472,881</del>	<del>12/5/95</del>	<del>Bebe et al.</del> Dup.			
u	16.	5,514,602	05/07/96	Brooks, Jr. et al.			
	17.	5,521,289	5/28/96	Hainfeld et al.			
	18.	5,543,158	8/6/96	Gref et al.			
	19.	5,571,726	11/05/96	Brooks, Jr. et al.			
	20.	5,665,582	9/9/97	Kaushch et al.			
u	21.	5,681,943	10/28/97	Letsinger et al.			

**OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.**

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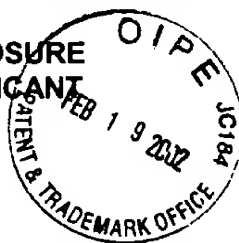
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		Document Number	Date	Country	Class	Subclass	Translation Yes No
u	22.	WO 89/06801	7/27/89	PCT			
	23.	WO 97/40181	10/30/97	PCT			
	24.	WO 98/04740	2/5/98	PCT			
	25.	WO 99/23258	10/30/98	PCT			
	26.	0 630 974 A2	06/21/94	EPO			
u	27.	0 667 398 A2	8/16/95	EPO			

**OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.**

u	28.	Alivisatos et al., "Organization of 'nanocrystal molecules' using DNA," <i>Nature</i> , Vol. 382, pp. 609-611 (1996)
	29.	Bain, et al., "Modeling Organic Surfaces with Self-Assembled Monolayers," <i>Angew. Chem. Int. Ed. Engl.</i> , Vol. 28, pp. 506-512 (1989)
	30.	Bradley, "The Chemistry of Transition Metal Colloids," <i>Clusters and Colloids: From Theory to Applications</i> , G. Schmid, Editor, BCH, Weinheim, New York, pp. 459-542 (1994)
	31.	Brust et al., "Novel Gold-Dithiol Nano-Networks with Non-Metallic Electronic Properties," <i>Adv. Mater.</i> , Vol. 7, pp. 795-797 (1995)
	32.	Chen et al., "A Specific Quadrilateral Synthesized from DNA Branched Junctions," <i>J. Am. Chem. Soc.</i> , Vol. 111, pp. 6402-6407 (1989)
	33.	Chen & Seeman, "Synthesis from DNA of a molecule with the connectivity of a cube," <i>Nature</i> , Vol. 350, pp. 631-633 (1991)
	34.	Chen et al., "Crystal Structure of a Four-Stranded Intercalated DNA: d(C <sub>4</sub> ) <sup>††</sup> <i>Biochem.</i> , Vol. 33, pp. 13540-13546 (1994)
u	35.	Dagani, "Supramolecular Assemblies DNA to organize gold nanoparticles," <i>Chemical &amp; Engineering News</i> , p. 6-7, August 19, 1996

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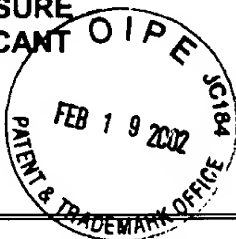
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## U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date

## OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.

u	36.	Dubois & Nuzzo, "Synthesis, Structure, and Properties of Model Organic Surfaces," <i>Annu. Rev. Phys. Chem.</i> , Vol. 43, pp. 437-464 (1992)
	37.	Elghanian et al., "Selective Colorimetric Detection of Polynucleotides Based on the Distance-Dependent Optical Properties of Gold Nanoparticles," <i>Science</i> , Vol. 277, pp. 1078-1081 (1997)
	38.	Grabar et al., "Preparation and Characterization of Au Colloid Monolayers," <i>Anal. Chem.</i> Vol. 67, pp. 735-743 (1995)
	39.	Hacia et al., "Detection of heterozygous mutations in BRCA1 using high density oligonucleotide arrays and two-colour fluorescence analysis," <i>Nature Genet.</i> , Vol. 14, pp. 441-447 (1996)
	40.	Jacoby, "Nanoparticles change color on binding to nucleotide target," <i>Chemical &amp; Engineering News</i> , p. 10, August 25, 1997
	41.	Letsinger et al., "Use of Hydrophobic Substituents in Controlling Self-Assembly of Oligonucleotides," <i>J. Am. Chem. Soc.</i> , Vol. 115, pp. 7535-7536 (1993)
	42.	Letsinger et al., "Control of Excimer Emission and Photochemistry of Stilbene Units by Oligonucleotide Hybridization," <i>J. Am. Chem. Soc.</i> , Vol. 116, pp. 811-812 (1994)
	43.	Marsh et al., "A new DNA nanostructure, the G-wire, imaged by scanning probe microscopy," <i>Nucleic Acids Res.</i> , Vol. 23, pp. 696-700 (1995)
	44.	Mirkin, "H-DNA and Related Structures," <i>Annu. Review Biophys. Biomol. Struct.</i> , Vol. 23, pp. 541-576 (1994)
	45.	Mirkin et al., "A DNA-based method for rationally assembling nanoparticles into macroscopic materials," <i>Nature</i> , Vol. 382, pp. 607-609 (1996)
	46.	Mirkin et al., "DNA-Induced Assembly of Gold Nanoparticles: A Method for Rationally Organizing Colloidal Particles into Ordered Macroscopic Materials," <i>Abstract 249, Abstracts of Papers Part 1, 212 ACS National Meeting 0-8412-3402-7, American Chemical Society, Orlando, FL, August 25-29, 1996</i>
	47.	Mucic et al., "Synthesis and characterizations of DNA with ferrocenyl groups attached to their 5'-termini: electrochemical characterization of a redox-active nucleotide monolayer," <i>Chem. Commun.</i> , pp. 555-557 (1996)
	48.	Mulvaney, "Surface Plasmon Spectroscopy of Nanosized Metal Particles," <i>Langmuir</i> , Vol. 12, pp. 788-800 (1996)
u	49.	Rabke-Clemmer et al., "Analysis of Functionalized DNA Adsorption on Au(111) Using Electron Spectroscopy," <i>Langmuir</i> , Vol. 10, pp. 1796-1800 (1994)

Examiner

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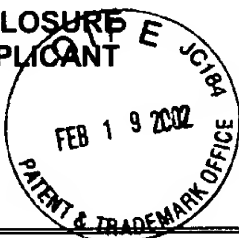
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## FOREIGN PATENT DOCUMENTS

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## OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.

50.	Roubi, "MOLECULAR MACHINES - Nanodevice with rotating arms assembled from synthetic DNA," <i>Chemical &amp; Engineering News</i> , p. 13, (Jan. 1999)
51.	Seeman et al., "Synthetic DNA knots and catenanes," <i>New J. Chem.</i> , Vol. 17, pp. 739-755 (1993)
52.	Shaw & Wang, "Knotting of a DNA Chain During Ring Closure," <i>Science</i> , Vol. 260, pp. 533-536 (1993)
53.	Shekhtman et al., "Stereostructure of replicative DNA catenanes from eukaryotic cells," <i>New J. Chem.</i> Vol. 17, pp. 757-763 (1993)
54.	Smith and Feigon, "Quadruplex structure of Oxytricha telomeric DNA oligonucleotides," <i>Nature</i> , Vol. 356, pp. 164-168 (1992)
55.	Thein et al., "The use of synthetic oligonucleotides as specific hybridization probes in the diagnosis of genetic disorders," 2 <sup>nd</sup> Ed., K.E. Davies, Ed., Oxford University Press, Oxford, New York, Tokyo, p. 21-33 (1993)
56.	Wang et al., "Assembly and Characterization of Five-Arm and Six-Arm DNA Brached Junctions," <i>Biochem.</i> , Vol. 30, pp. 5667-5674 (1991)
57.	Wang et al., "A DNA Aptamer Which Binds to and Inhibits Thrombin Exhibits a New Structural Motif for DNA," <i>Biochem.</i> , Vol. 32, pp. 1899-1904 (1993)
58.	Weisbecker et al., "Molecular Self-Assembly of Aliphatic Thiols on Gold Colloids," <i>Langmuir</i> , Vol. 12, pp. 3763-3772 (1996)
59.	Wells, "Unusual DNA Structures," <i>J. Biol. Chem.</i> , Vol. 263, pp. 1095-1098 (1988)
60.	Zhang et al., "Informational Liposomes: Complexes Derived from Cholesteryl-conjugated Oligonucleotides and Liposomes," <i>Tetrahedron Lett.</i> , Vol. 37, pp. 6243-6246 (1996)

Examiner

Date Considered

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## FOREIGN PATENT DOCUMENTS

Document Number	Date	Country	Class	Subclass	Translation Yes No

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc).

1.	Brada, et al., "Golden Blot" - Detection of Polyclonal and Monoclonal Antibodies Bound to Antigens on Nitrocellulose by Protein A-Gold Complexes, <i>Analytical Biochemistry</i> , Vol. 42, pp. 79-83 (1984) U.S.
2.	Dunn, et al., "A Novel Method to Map Transcripts: Evidence for homology between an Adenovirus mRNA and Discrete Multiple Regions of the Viral Genome, <i>Cell</i> , Vol. 12, pp. 23-36, (1997) U.S.
3.	Hacker, "High performance Nanogold - Silver in situ hybridisation, <i>Eur. J. Histochem</i> , Vol. 42, pp. 111-120 (1998) U.S.
4.	Ranki, et al., "Sandwich hybridization as a convenient method for the detection of nucleic acids in crude samples," <i>Gene</i> , Vol. 21, pp. 77-85 (1983) U.S.
5.	Romano, et al., "An antiglobulin reagent labelled with colloidal gold for use in electron microscopy," <i>Immunochemistry</i> , Vol. 11, pp. 521-522 (1974) Great Britain

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DATE CONSIDERED

2/21/03

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<i>h</i>	1.	5,609,907	03/11/97	Natan			
	2.	6,025,202	02/15/00	Natan			
<i>h</i>	3.	6,149,868	11/21/00	Natan, et al.			

## FOREIGN PATENT DOCUMENTS

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2	1.	5,599,668	02/04/97	Stimpson, et al.	2	3	
2	2.	5,990,479	11/23/99	Weiss, et al.	2	3	

## FOREIGN PATENT DOCUMENTS

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## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc).

2	3.	Stimpson, et al., "Real-time detection of DNA hybridization and melting on oligonucleotide arrays by using optical wave guides," <i>Proc. Natl. Acad. Sci.</i> , Vol. 92, pp. 6379-6383, California Institute of Technology (1995) U.S.
	4.	Storhoff, et al., "Strategies for Organizing Nanoparticles into Aggregate Structures and Functional Materials," <i>Journal of Cluster Science</i> , Vol. 8, No. 2, pp. 179-217, Plenum Publishing Corporation (1997) U.S.
	5.	Storhoff, et al., "One-Pot Colorimetric Differentiation of Polynucleotides with Single Base Imperfections Using Gold Nanoparticle Probes," <i>J. Am. Chem. Soc.</i> , Vol. 120, pp. 1961-1964, American Chemical Society (1998) U.S.
	6.	Velev, et al., "In Situ Assembly of Colloidal Particles into Miniaturized Biosensors," <i>Langmuir</i> , Vol. 15, No. 11, pp. 3693-3698, American Chemical Society (1999) U.S.
2	7.	Zhu, et al., "The First Raman Spectrum of an Organic Monolayer on a High-Temperature Superconductor: Direct Spectroscopic Evidence for a Chemical Interaction between an Amine and YBa <sub>2</sub> Cu <sub>3</sub> O <sub>7-δ</sub> ," <i>J. Am. Chem. Soc.</i> , Vol. 119, pp. 235-236, American Chemical Society (1997) U.S.

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## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc).

8.	Yguerabide, et al., "Light-Scattering Submicroscopic Particles as Highly Fluorescent Analogs and Their Use as Tracer Labels in Clinical and Biological Applications," I. Theory, <i>Analytical Biochemistry</i> , Vol. 262, pp. 137-156 (1998) U.S.
9.	Yguerabide, et al., "Light-Scattering Submicroscopic Particles as Highly Fluorescent Analogs and Their Use as Tracer Labels in Clinical and Biological Applications," II. Experimental Characterization, <i>Analytical Biochemistry</i> , Vol. 262, pp. 157-176 (1998) U.S.

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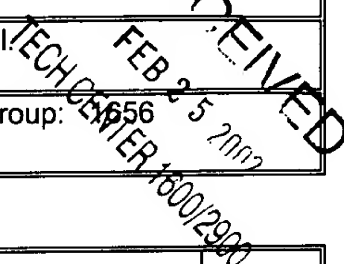
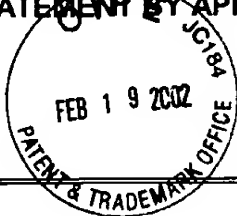
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<i>h</i>	1.	5,288,609	02/08/94	Mroczkowski, et al.			
	2.	5,284,748	02/22/94	Engelhardt, et al.			
	3.	5,360,895	11/01/94	Hainfield, et al.			
	4.	5,384,265	01/24/95	Kidwell, et al.			
	5.	5,472,881	12/05/95	Beebe, et al.			
	6.	5,599,668	02/04/97	Stimpson, et al.			
	7.	5,637,508	06/10/97	Kidwell, et al.			
	8.	5,751,018	05/12/98	Alivisatos, et al.			
	9.	5,939,021	08/17/99	Hansen, et al.			
<i>h</i>	10.	5,990,479	11/23/99	Weiss, et al.			

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<i>h</i>	11.	WO 93/10564	27 May 93	PCT				
	12.	WO 98/10289	12 March 98	PCT				
	13.	WO 99/23258	14 May 99	PCT				
	14.	WO 99/21934	06 May 99	PCT				
<i>h</i>	15.	WO 99/20789	29 April 99	PCT				

## OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.

<i>h</i>	16.	O.D. Velez, et al., "In Situ Assembly of Collordal Particles into Miniaturized Biosensors," <i>Langmuir</i> , Vol. 15, No. 11, pp. 3693-3698, May 25, 1999
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